favorable or unfavorable climatic conditions are of greater importance in determining the abundance or scarcity of insects as a whole than are other natural checks such as parasitic and other enemies, or even fungous or bacterial diseases."

There is hardly anything more characteristic of publications on economic entomology than the remark, after detailing the activities of predators, parasites, and diseases, that none of these can be depended upon for controlling the pests. Mr. Ainslie's remark therefore "that useful as birds are in their way, they can seldom be depended upon unaided to rid us of our insect enemies" is just as true in general of parasitic insects and other natural enemies as it is of birds. What needs to be kept in mind at all times is that in assigning economic values to natural enemies, it is best to speak in terms of tendencies rather than of achievements. Good economic tendencies are as satisfactory as any grounds for advocating the protection of natural enemies.

U. S. Biological Survey,
Washington, D. C.

MIGRATION OF CANADA GEESE FROM THE JACK MINER SANCTUARY AND BANDING OPERATIONS

BY MANLY F. MINER

Much ink has been used by various writers and authors describing the origin and history of the Jack Miner Bird Sanctuary, but to me the big achievement there has been scarcely mentioned, namely, the catching and tagging of the Canada Goose to study its route of migration in both spring and fall, and to find where it nests and raises its young during the summer months.

It was in 1902 and 1903 that Jack Miner conceived the idea of establishing a bird sanctuary, the first of its kind in Canada, if not on the continent. But not until 1904 was work on the sanctuary actually started, that is, excavations made for ponds, several wing-tipped live decoy geese placed on same, and corn spread plentifully around the banks. Ducks and geese, in a short time, found this to be a place of safety. Both the conservationists and shooters were back of the Jack Miner scheme, because the Sanctuary, taking nothing from the shooters, constantly builds up the hunters' chances a mile away, the bird haven attracting many birds to the community. At the same time the birds became wise enough, when shot at from the property where they were unprotected, to fly back to their safety zone and haven of rest.

Eventually the birds commenced to congregate on the Sanctuary in large numbers. Jack Miner had no desire to shoot, but was anxious to study and find out where these feathered creatures spent each season of the year. On August 5, 1909, he caught a duck and wrapped around its leg a piece of aluminum, on which was stamped his post office address. This was the first time Jack Miner had done such a thing and, incidentally, this record is probably the first of the kind on the continent. Thus not only is Jack Miner's Sanctuary the first of its kind in North America, but he is the pioneer in tagging ducks.

A few months later—January 14, 1910—the duck which had the honor of bearing the first tag was killed by W. E. Bray of Anderson, S. C.

Naturally, great enthusiasm was caused and the problem then confronting the owner of the Sanctuary was how to build nets and other contrivances to catch the ducks without injuring them, in order that they might be tagged. He had no books or plans to which he could refer, for there was nothing of the kind in existence. So, after attracting the birds to the Sanctuary, it fell to the lot of Jack Miner to invent a contrivance for catching the ducks. This he accomplished after many months of work, the result being that today there are hundreds and hundreds of ducks flying to and fro across the continent wearing his tags. Nearly every mail brings reports to the Sanctuary from hunters of North America of the killing of tagged birds.

By 1914 Jack Miner had learned where ducks, Mourning Doves, Robins, etc., spend each season of the year. His next ambition was to catch and tag Canada Geese, the wildest of wild birds and practically the largest migratory waterfowl on the continent. He soon found that catching Canada Geese was a very different undertaking compared with catching ducks. Although the geese, at this time, were coming to his Sanctuary by the hundreds for food and protection—where neither rich nor poor could enter with a gun; but to catch one of these birds for tagging purposes was another thing. They would not go near the network he had arranged for catching ducks. So, after a year's constant study, he contrived a method of having two ponds with a canal connecting them covered with network and a trapdoor at both ends. It was in 1915 that he caught his first wild Canada Goose and placed an aluminum tag on its leg, giving the post office address of the owner of the Sanctuary.

Jack Miner is by no means a religious fanatic, but he believes in the simple teachings of Christ and, being anxious to make his tagging system complete and fascinating, a short verse of scripture, such as

FIG. 8. Canada Geese on the Jack Miner Sanctuary.

FIG. 9. Canada Geese rising from the Jack Miner Sanctuary.

"Have faith in God," "God is able." and so forth, is stamped on one side of his tag. In this way every person who gets one of his tagged birds gets a verse of scripture, which has more than doubled the interest of his tagging system.

In the spring of 1915 and just before the geese migrated for parts unknown in the North, he caught and tagged his first Canada Goose, and liberated it again with the big flock from which it had been taken. Interest was aroused in the community as to who would kill it, and where. No one had ever caught one before for tagging purposes, no one knew where they nested. All that was known was that they went north and the settler in the most northern point in Canada always reported that "they went still farther north."

However, weeks and months rolled by and, to the surprise of everyone, early in October of the same year, Jack Miner received a letter from the Hudson Bay Company at Moose Factory, dated August 19, 1915, containing this tag. The goose had been killed by an Indian in unsurveyed territory in the Hudson Bay District.

This, naturally, interested the whole country, and, with real enthusiasm, Jack Miner began to work on the improvement of his goose trap in order to catch geese by the hundreds. The next year it proved to be a decided success. Many more geese were tagged and, later on in the season, word was received from different points along the east side of Hudson Bay and James Bay, and as far as Baffin Land of tagged geese being shot.

On one occasion the Reverend W. G. Walton, an Anglican missionary, who had spent between twenty and thirty years among the Indians and Eskimos and had never been out to civilization, came by canoe from Hudson Bay to Cochrane. Taking the train there, he in due course arrived at Kingsville and the Sanctuary. With him he brought a pocketful of tags, each of which bore a passage of scripture and Jack Miner's post office address. He had collected these from the Indians and Eskimos all the way from the factory, at James Bay, along the east coast of Hudson Bay and as far north as Baffin Land. The natives had brought them to him for interpretation of the verse of scripture.

Through these tags, this devoted Christian missionary, together with the Hudson Bay fur dealers and the agents of Revillion Fur Company, who have also cooperated to a great extent in collecting them from the natives, a lot of valuable information as to why these birds nest around the shores and islands of Hudson Bay and Baffin Land, instead of along the rivers and streams, has been revealed to the world.

FIG. 10. Wild Swans and other fowl on the Jack Miner Sanctuary.

FIG. 11. Jack Miner and his home.

The geese arrive in that vicinity around the latter part of April and the first part of May. The rivers and all fresh water are all frozen over at that season of the year, but the Hudson Bay is opened up by the incoming ocean current and the geese prefer to nest where there is open water.

The tagging system has also revealed where they spend their winters. Each tag bears a date and it has been proven that very few geese which visit the Sanctuary in the fall visit the following spring, as practically all geese bearing fall tags are killed in the middle states, along the east of the Mississippi River and towards the Gulf of Mexico, while geese which are tagged in the spring winter along the Atlantic coast, mostly around Carrituck Sound. The geese which spend the winter along the Atlantic seaboard nest in the extreme northerly portion of Hudson Bay and Baffin Land. When the fall comes and it turns cold, instead of migrating inland, they follow the ocean around by the way of Labrador, Newfoundland, and the New England coast, southward to Carrituck Sound. But when March and early April come, it is too warm in North Carolina for them. The Labrador coast and their summer quarters, however, are still frozen over with zero temperatures. The geese, therefore, migrate north from the southern states to the Great Lakes region, where they congregate at this Sanctuary during the months of March and April.

There have been tagged nearly 6,000 geese since 1915 and year after year those that are not killed return to this protected property, wearing their bright aluminum bands around their legs. This fall 100 geese out of 500 which stood on one of our ponds wore tags. The pond is only one acre in size and as I look at the map of North America in my old school geography, there are no words or anything small enough to represent one acre on it. Even the dot of a pencil would represent several square miles. Yet the most remarkable thing about the migration of these birds is that year after year, as regularly as the sun rises, those that are not killed find their way back to the Jack Miner Sanctuary at Kingsville, Ontario, Canada.

Kingsville, Ontario.